

1 Claims

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3 1. Well treatment apparatus comprising a cutting
4 tool; a sealing device to seal a portion of a
5 wellbore; and an anchor means to anchor the
6 apparatus with respect to the wellbore.

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8 2. Well treatment apparatus as claimed in claim
9 1, wherein the sealing device comprises at least one
10 annular cup-type device.

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12 3. Well treatment apparatus as claimed in claim 1
13 or claim 2, adapted to attach to a drillstring.

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15 4. Well treatment apparatus as claimed in claim
16 3, wherein the sealing device is adapted to, in use,
17 seal the annulus between the drillstring and the
18 innermost casing of the wellbore.

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20 5. Well treatment apparatus as claimed in claim
21 4, wherein the cup device has a cup-shaped body and
22 a part of the cup device is adapted to deform
23 outwards to seal the annulus upon the application of
24 pressure from inside the cup-shaped body.

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26 6. Well treatment apparatus as claimed in any
27 preceding claim, wherein the sealing device
28 comprises more than one annular cup device, at least
29 two of the annular cup devices being orientated in
30 the same direction to provide a double seal between
31 the portion of the wellbore beneath the sealing
32 device and the surface of the wellbore.

1 7. Well treatment apparatus as claimed in any
2 preceding claim, wherein the sealing device
3 comprises more than one annular cup device and at
4 least two of the annular cup devices are orientated
5 in opposite directions to seal the portion of the
6 apparatus in between the two oppositely-orientated
7 devices from the rest of the bore.

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9 8. Well treatment apparatus as claimed in claim
10 7, wherein at least one fluid-circulation device is
11 located between the two oppositely-orientated cup
12 devices.

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14 9. Well treatment apparatus as claimed in any
15 preceding claim, wherein a fluid-circulation device
16 is located below the sealing device.

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18 10. Well treatment apparatus as claimed in any
19 preceding claim, including at least one further
20 sealing device at the downhole end of the apparatus,
21 the further sealing device being adapted to seal the
22 portion of the borehole in which the rest of the
23 apparatus is located from the portion of the
24 borehole below the apparatus.

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26 11. Well treatment apparatus as claimed in any
27 preceding claim, wherein the cutting tool comprises
28 a jet cut nozzle capable of cutting through wellbore
29 casing, capable of rotation through 360°, and
30 capable of rotation in at two perpendicular planes.

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32 12. Well treatment apparatus as claimed in any

1 preceding claim, wherein at least one part of the
2 anchor means is laterally extendable.

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4 13. Well treatment apparatus as claimed in claim
5 12, wherein the laterally extendable part of the
6 anchor means has a high-friction surface for
7 engaging the casing.

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9 14. Well treatment apparatus as claimed in claim
10 12 or claim 13, wherein the anchor means has a
11 radial casing-contacting surface.

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13 15. A method of treating a well, including the
14 steps of:

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16 inserting well treatment apparatus into a cased
17 wellbore, the apparatus including a cutting
18 tool, a sealing device and an anchor means;

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20 perforating the innermost casing in two
21 vertically spaced positions; and

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23 injecting cement into a portion of the annulus
24 between the two innermost casing strings to
25 seal the annulus;

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27 whereby the method includes the step of using
28 the anchor means to anchor the apparatus to the
29 cased wellbore.

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31 16. A method as claimed in claim 15, including the

1 step of pressure-testing the innermost casing before
2 the first perforation is made by injecting a fluid
3 into the wellbore below the sealing means.
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5 17. A method as claimed in claim 15 or claim 16,
6 including the step of pressure testing the annulus
7 before the second perforation is made by injecting a
8 fluid into the wellbore below the sealing means and
9 measuring the equilibrium rate of pumping as the
10 fluid flows through the first perforation into the
11 annulus.
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13 18. A method as claimed in any of claims 15 to 17,
14 including the step of pressure testing the annulus
15 after the second perforation has been made by
16 injecting a fluid into the annulus to check that
17 there are no blockages in the part of that annulus
18 lying between the vertically spaced perforations.
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20 19. A method as claimed in any of claims 15 to 18,
21 wherein the sealing device includes two oppositely-
22 orientated cup devices, and the cement is injected
23 into the annulus from an aperture in the apparatus
24 located between these two cup devices.
25

26 20. A method as claimed as claimed in any of
27 claims 15 to 19, including the step of pressure
28 testing the sealed annulus by positioning the
29 apparatus so that the sealing device lies between
30 the two vertically spaced perforations and by
31 injecting fluid into the wellbore below the sealing
32 device.

1 21. A method as claimed in any of claims 15 to 20,
2 including the step of using the cutting tool to
3 sever the casings above the perforations after the
4 annulus has been sealed.

5
6 22. A method as claimed in any of claims 15 to 21,
7 the method including the step of undertaking at
8 least one pressure test by injecting fluids, whereby
9 during the pressure test, the apparatus is anchored
10 to the casing by the anchor means to counter the
11 upwards force on the apparatus by the injected
12 fluids.

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14 23. A method as claimed in any of claims 15 to 22,
15 wherein the well treatment apparatus is mounted on a
16 drillstring and is manoeuvred in the wellbore by
17 raising and lowering the drillstring.

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